TWO NEW SUBSPECIES OF *SIDALCEA HICKMANII* (MALVACEAE) IN CALIFORNIA

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ABSTRACT

Revised treatments for *Sidalcea* for the upcoming Second Edition of the *Jepson Manual* and the *Flora of North America* have led to the discovery of several additional taxa. **Sidalcea hickmanii** subsp. **napensis** and subsp. **pillsburiensis** are described as new from northern California. As with the other four described subspecies, the two new taxa are found in very small isolated populations in upland areas of open chaparral vegetation, the former from Napa County, and the latter from Lake County. They may represent relict populations. Unlike most other populations of the species, the two new taxa are not necessarily associated with serpentine. The two new subspecies, and the others, may be vulnerable to grazing, foraging and human-caused changes in their environments.

KEY WORDS: California, *Sidalcea hickmanii*, Malvaceae, North America, rare plants

RESUMEN

Los tratamientos de *Sidalcea* para la segunda edición del *Jepson Manual* y la *Flora of North America* han llevado al descubrimiento de varios taxa adicionales. Se describen **Sidalcea hickmanii** subsp. **napensis** y subsp. **pillsburiensis** como nuevos del norte de California. Tal como ocurría con las otras cuatro subespecies descritas, los dos nuevos taxa se encuentran en poblaciones aisladas muy pequeñas en áreas altas con vegetación de chaparral abierto, la primera del condado de Napa, y la segunda del condado de Lake. Pueden representar poblaciones relictas. Al contrario que la mayoría de las otras poblaciones de la especie, los dos nuevos taxa no están necesariamente asociados con serpentinas. Las dos nuevas subespecies, y las otras, pueden ser vulnerables al pastoreo y cambios antrópicos en sus medios.

INTRODUCTION

Sidalcea hickmanii Greene has long been known to exist in only a few widely scattered isolated populations, generally on serpentine (Roush 1931; Hitchcock 1957), and the survival of these populations appears to be dependent on occasional fires. Until recently, the species was thought to be a California endemic, but the discovery of a population in southern Oregon, yet to be fully studied, has shown that this is not the case (Halse, pers. comm.). This distribution can be interpreted as relictual for a species formerly more widely distributed that has become separated into several isolated parts, each part subsequently diverging through inbreeding. Work by Andreasen and Baldwin (2001) suggests that the species is not only basally divergent within the genus but that it 'evolved significantly more slowly than most of the other perennials'. Previously, four subspecies of *S. hickmanii* have been described; namely, the typical subspecies, subsp. *hickmanii*, restricted to the Santa Lucia Mountains in Monterey County; subsp. *anomala* C.Hitchc., restricted to the region of Cuesta Pass in San Luis Obispo County; subsp. *parishii* (Robinson) C.Hitchc., known from a few sites in San Bernardino and Santa Barbara cos.; and subsp. *viridis* C.Hitchc., restricted to Big Carson Ridge in Marin County. Reports of the species in Sonoma County have not yet been substantiated and several coastal specimens examined from that county that had been reported as this plant were actually *S. malviflora*. Specimens of unusual individuals of *S. hickmanii* at three sites have been brought to my attention by their discoverers since the publication of the most recent treatment of the genus in the *Jepson Manual* (Hill 1993). An examination of the specimens and images of these plants led me to the conclusion that two new Californian subspecies of this distinctive species needed description.

Sidalcea hickmanii Greene subsp. **napensis** S.R. Hill, subsp. nov. (**Fig. 1**) TYPE: U.S.A. CALIFORNIA. Napa Co.: W of Leoma Lakes at base of Mt. George, elevation 1380 ft; Mt. George quad., T6N, R3W, NE/4 of NE/4 Sec. 29; chaparral, on brushy

Fig. 1. Holotype of *Sidalcea hickmanii* Greene subsp. *napensis* S.R. Hill, subsp. nov., *Jake Ruygt 2959*, 15 May 1992 (JEPS 110725).

gradual slope washed by sheet runoff; openings; rhyolite, biennial or perennial?, 2–3 dm tall; corolla pale pink, 15 May 1992, *J. Ruygt 2959* (HOLOTYPE: JEPS 110725!).

Herba perennis e caudicem erectum parvum, radice palari elongato. Caules pauci erecti, ± 20–30(–40) cm, saepe rubelli, pubescentes pilis stellatis caespitosis dispersis simplicibusque. Folia pauca (< 6 per caulem) pubescentia pilis stellatis; folia mediana petiolis 10–25 mm longis, flexis in summis 2.5–3 mm; laminis latitudine plus quam longitudine, 10–17(–20) mm longis × 15–25(–34) mm latis, 3–5(–7)-lobatis palmatim prope basim, lobis dentatis profundis; stipulis ovatis, 5–6 mm longis × 2–3 mm latis, 3–5-nervatis, ciliatis; folia basi crenata interdum. Inflorescentia racemus spiciformis, floribus dispersis 2-bracteatis, bracteis similis stipulis sed pubescentioribus, bracteolis 3 persistentibus, 5–6 mm longis × 0.7–1.0 mm latis, calycibus 7–10 mm longis × 11–12 mm latis, pubescentibus dense, pilis stellatis, lobis ciliatis; petalis roseis pallidis 9–11(–15) mm longis × 6–9 mm latis. Fructus schizocarpium, 6–7-mericarpiis 2 mm altis × 2.0–2.5 mm longis × 1.5–1.8 mm latis, parietibus lateralibus laevibus, dorsis marginibusque 2–5-corrugatis-sinuatis, stria mediano in dorso; cuspide (mucrone) 0.

Perennial herb from a small erect caudex, generally with an elongated taproot or rootstock. Stems few, erect (to slightly ascending), ± 20–30(–40) cm tall, often tinted reddish (maroon), pubescent with scattered tufted stellate hairs and a few simple hairs. Leaves few (< 6 per stem), pubescent with gen 6-rayed stellate hairs; mid-stem leaves with petioles 10–36 mm long (to 6 cm on lower leaves), bent in the uppermost 2.5–3 mm (this portion pulvinus-like); blades wider than long, 10–17(–20) mm long × 15–25(–34) mm wide, palmately 3–5(–7)-lobed nearly to the base, the cuneate lobes deeply few-toothed; stipules ovate, persistent, 5–6 mm long × 2–3 mm wide, 3–5-nerved, ciliate; a few leaves at the base occasionally deeply crenate. Inflorescence a spiciform raceme, flowers scattered below, overlapping above, pedicels ca. 2 mm long, subtended by 2 bracts similar to the stipules but more pubescent, 5.5–7 mm long; bractlets 3, persistent, 5–6 mm long × 0.7–1.0 mm wide; calyx 7–10 mm long × 11–12 mm wide, densely pubescent with stellate hairs, lobes ciliate; petals pale pink, 9–11(–15) mm long × 6–9 mm wide. Fruit a schizocarp with 6–7 mericarps 2 mm tall × 2.0–2.5 mm long × 1.5–1.8 mm thick, with smooth lateral walls, the back and margins with 2–5 wavy corrugations, single median line on back, cusp (mucro) 0.

The paratypes I have cited below include all other collections I have examined, most of which were collected at the same site. A single robust specimen with 8 main flowering stems and a caudex 3 cm wide was collected in 1942 at a second site west of St. Helena, but the current status of this population, as well as other specific details, are unknown. On 7 May the lowermost flowers in the spikes had just opened. Habitat information for the known extant population at the base of Mt. George suggests *S. hickmanii* subsp. *napensis* is a plant of open mixed and chamise chaparral in rocky rhyolitic soils, at an elevation of 421 (417–427) m (1380 ft; 1370–1400 ft). The total number of plants is incompletely known, but the number was approximated at 30 individuals (Ruygt, pers. comm.). When discovered on 29 April 1992, the first flowers were opening, and flowering continued until at least 2 June 1992, at which time some fruits were mature. Some of the plants discovered may have been browsed, and so the stems may exceed 3 dm in height (Ruygt, pers. comm.). No subsequent observations have been made. This population is on private land, the Wild Horse Valley Ranch, which may be developed as a vineyard (Ruygt, pers. comm.).

Etymology.—This new subspecies was brought to my attention in 1992 by Jake Ruygt who discovered the plant while he was conducting botanical surveys as a subcontractor, and also as part of his ongoing research on the flora of Napa County, and its epithet has been chosen to reflect its known distribution.

The plants were growing in a sparsely vegetated area, described as Chamise and Mixed Chaparral (Ruygt, pers. comm.), with bare soil and abundant coarse gravel at a site where water puddles ephemerally following rain. The immediate associates were *Mimulus bolanderi* A.Gray, *Mimulus rattanii* A.Gray, *Navarretia heterodoxa* (Greene) Greene, and *Phacelia suaveolens* Greene. The typical local components in this plant community were *Adenostoma fasciculatum* Hook. & Arn., *Arctostaphylos canescens* Eastw., *A. glandulosa* Eastw., *A. stanfordiana* C.Parry, *Ceanothus purpureus* Jepson, *Pickeringia montana* Nutt., *Quercus wislizenii* var. *frutescens* Engelm., and *Rhamnus californica* Eschsch. The specimen matched best *Sidalcea hickmanii* subsp. *viridis* C. Hitchc. and this was my first tentative identification in September 1992, but it obviously differed from that

in its deeply lobed leaves. Similar leaves are found on one other subspecies, *S. hickmanii* subsp. *anomala*, known only from the vicinity of Cuesta Pass in San Luis Obispo Co., but the new subspecies differs from that by its smaller bracts that are considerably shorter than the calyx, the fewer stems per plant, the essentially unbranched inflorescence, and its rather different habitat and range.

The single, and first, specimen of the new subspecies was collected west of St. Helena in 1942 by Milo S. Baker near the summit of Spring Mountain Road, apparently not far from the Sonoma County line, but precise location details were not recorded on the label. This general area lies within an elevation of 427–609 m (1400–2000 ft). Jake Ruygt brought this specimen to my attention as well and it is most certainly the same new subspecies.

PARATYPES. **U.S.A. California. Napa Co.:** divide between Santa Rosa and Napa Valley at point west of St. Helena town, near summit of Spring Mt. Road, 7 May 1942, *M.S. Baker 10193* (Milo S. Baker Collection 009782 at NCC!); E side of Mount George, ca. 4 mi E of Napa; elev. ca. 1380 ft; Chamise chaparral; lightly distributed in a sparsely vegetated area; rocky soils that puddle ephemerally following rain; associated with *Mimulus rattanii* and *Phacelia suaveolens*, 2 Jun 1992, *J. Ruygt 3019* (VT!); W of Leoma Lakes at base of Mt. George, elevation 1380 ft; Mt. George quad., T6N, R3W, NE/4 of NE/4 Sec. 29; chaparral, on rocky flat, roadway; Rhyolite, biennial or perennial?, 1.5–2 dm tall; corolla pink, 29 Apr 1992, *J. Ruygt 2911* (Ruygt pers. coll.!).

Sidalcea hickmanii Greene subsp. **pillsburiensis** S.R. Hill, subsp. nov. (**Figs. 2–4**). TYPE: U.S.A. CALIFORNIA. Lake Co.: [vicinity of Lake Pillsbury] in tractor trail just under 2 mi S of Big Squaw Valley, T18N, R9W, SW/4 of SW/4 Sect. 8, in Mt. Diablo Meridian and Base; GPS: NAD 27, 10S 0508308 E 4363785 N [UTM] [39.4375 N. Lat., -122.9375 W. Long.], on slopes of ephemeral drainage in chaparral adjacent overstory of *Pinus attenuate*; light pink flowers; associates: *Ceanothus foliosus*, *Arctostaphylos patula*, *Adenostoma fasciculatum*, *Baccharis pilularis*, *Quercus berberidifolia*, *Deschampsia elongata*, 12 Jul 2005, *D.W. Isle 1124 with Tara Athan* (HOLOTYPE: JEPS 113056!).

Herba pumila perennis e caudicem erectum parvum. Caules aliquot erecti, ± (5–)10–30(–40) cm, viridulis, pubescentes pilis stellatis appressis densis moderate. Folia pauca (< 6 per caulem) pubescentia pilis stellatis caespitosis; folia mediana petiolis 6.5–20 mm longis; laminis latitudine plus quam longitudine, latiflabellatis, 8–15 mm longis × 12–22 mm latis, 7-nervatis palmatim, inlobatis, crenatis profundis aliquantum, ± 12-crenis; stipulis latilanceolatis, ± 3 mm longis × 1.3 mm latis, 1-nervatis, pilis similaribus atque in foliis. Inflorescentia floribus solitariis axillaribus aut brevis racemus, floribus dispersis prope basin 2-bracteatis, vel ad apicem bracteis solitariis, bracteis solitariis oblongis alveiformibus, brevioribus quam calycibus; bracteolis 3 oblongis persistentibus, 3 mm longis × 0.8–1.0 mm latis, brevioribus bis quam calyce, calycibus 4–5 mm longis × ± 6 mm latis, puberulis dense, pilis stellatis minutis omnibus; petalis roseis pallidis 8–10 mm longis × 4 mm latis. Fructus schizocarpium (4–)6–7-mericarpiis 1.5–2 mm altis × 2.0–2.3 mm longis × 1.0–1.3 mm latis, parietibus lateralibus laevibus, dorsis marginibusque 2–5-corrugatis-sinuatis, stria mediano in dorso; cuspide (mucrone) 0.

Dwarf perennial herb from a small erect caudex. Stems several, erect, ± (5–)10–30(–40) cm tall, greenish, pubescent with appressed moderately dense stellate hairs. Leaves few (< 6 per stem), pubescent with tufted stellate hairs; mid-stem leaves with petioles 6.5–20 mm long; blades wider than long, broadly fan-shaped, 8–15 mm long × 12–22 mm wide, palmately 7-veined, unlobed, rather deeply crenate, ± 12-crenations; stipules wide-lanceolate, ± 3 mm long × 1.3 mm wide, 1-nerved, with hairs similar to those on the leaves. Inflorescence with solitary axillary flowers or a short raceme, flowers scattered, those towards the base 2-bracted or with single bracts on those towards the apex, the single bracts oblong, cupped, much shorter than the calyx; bractlets 3, oblong, persistent, 3 mm long × 0.8–1.0 mm wide, half as long as the calyx; calyces 4–5 mm long × ± 6 mm wide, densely puberulent, with all hairs minute, stellate; petals pale pink (appearing nearly white in bright sunlight), 8–10 mm long × 4 mm wide. Fruit a schizocarp with (4–)6–7 mericarps 1.5–2 mm tall × 2.0–2.3 mm long × 1.0–1.3 mm thick, with smooth lateral walls, the back and margins with 2–5 wavy corrugations, single median line on back, cusp (mucro) 0.

I have seen only the single collection, but the plant has also been documented rather well with digital images. Habitat information and the images suggest that *S. hickmanii* subsp. *pillsburiensis* is a plant of open chaparral on non-serpentine rocky soils of the Franciscan Formation, at an elevation of 701 m (2300 ft). Only a single population has been documented and the total number of plants is unknown, though 24 were large enough to be counted and protected from browsing animals within wire mesh enclosures. Additional seedlings were found beneath *Ceanothus* shrubs in the Spring of 2006 (T. Athan, pers. comm.). When dis-

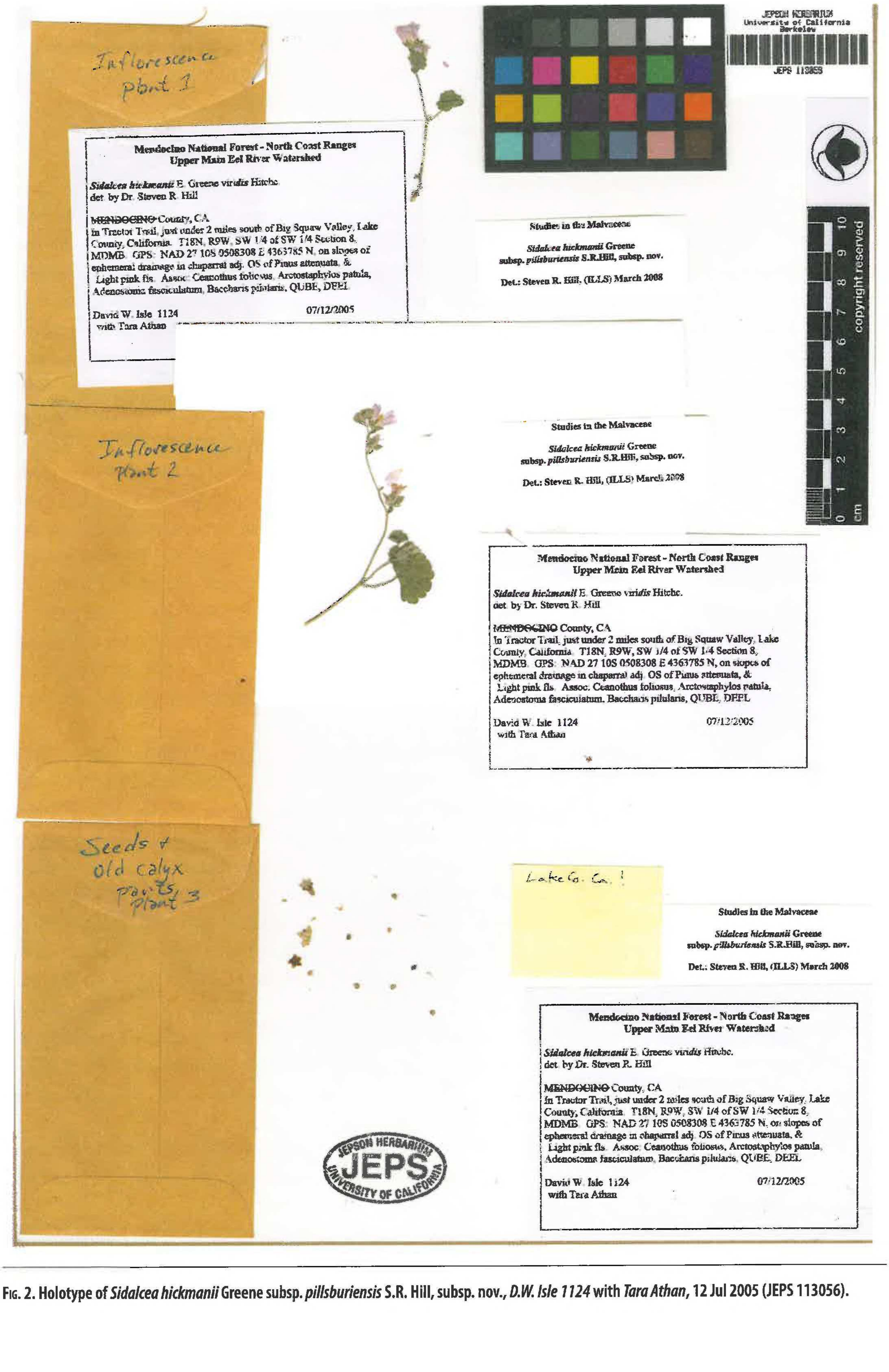

FIG. 2. Holotype of *Sidalcea hickmanii* Greene subsp. *pillsburiensis* S.R. Hill, subsp. nov., *D.W. Isle 1124* with *Tara Athan*, 12 Jul 2005 (JEPS 113056).

covered on 7 July 2003, the plants were in flower. On 12 July 2005 plants were still in flower, and a few ripe fruits were also found, and it continued to flower until at least 27 August 2005. The site was visited several additional times in late 2005 and early 2006, but no information is available on more recent visits. This single population is on Mendocino National Forest land (under federal ownership).

Etymology.—The subspecies epithet has been chosen to reflect its known distribution close to the margin of, and upslope from, Lake Pillsbury.

This new subspecies was brought to my attention by National Forest botanist David Isle who, along with fellow botanist David Toren, discovered the plant during surveys of a tractor fire line near Lake Pillsbury in 2003 ("Tractor Line, Big Squaw Valley to 2001 Pillsbury Fire"). The plants were growing in a sparsely vegetated area with bare soil and gravel on both slopes of an ephemeral drainage. In this habitat the water flow would be limited to winter rain events, but no areas of pools were evident. The plant association (D. Isle, pers. comm.) best fits the description of scrub oak—chamise chaparral, with dominants that included *Quercus berberidifolia* Liebm. and *Adenostoma fasciculatum*, as well as the associates *Arctostaphylos patula* Greene, *Arnica* sp., *Baccharis pilularis* DC., *Camissonia hirtella* (Greene) Raven, *Ceanothus foliosus* C.Parry, *Cryptantha* sp., *Deschampsia elongata* (Hook.) Benth., *Epilobium minutum* Lindl. ex Lehm., *Galium nuttallii* A.Gray, *Lotus denticulatus* (E.Drew) Greene, *Madia minima* (A.Gray) Keck, *Mimulus moschatus* Doug. ex Lindl., *Nemacladus capillaris* Greene, *Pedicularis densiflora* Benth. ex Hook., *Penstemon heterophyllus* Lindl., *Polygala californica* Nutt., and *Potentilla* cf. *glandulosa* Lindl. It adjoined a knobcone pine / chamise association, dominated by *Pinus attenuata* Lemmon and *Adenostoma fasciculatum*. The images and sample sent to me in 2005 matched best *Sidalcea hickmanii* subsp. *viridis* C.Hitchc. and this was my first tentative identification, but it appeared to differ from that in its dwarfed habit, open inflorescence, and shorter bracts and bracteoles. The crenate, truncate leaves can be found on that subspecies and on the typical subspecies as well, but these were remarkably small on this new subspecies in comparison. Another difference noted was in the pubescence of the upper stem; in this new subspecies the hairs are stellate but appressed, whereas on subsp. *viridis* the hairs are distinctly tufted. The flowers appeared closer to bright white than pink when fresh (D.Isle, pers. comm.).

Sidalcea hickmanii subsp. *pillsburiensis* has been collected twice. The first collection was made by David Toren and David Isle on 7 July 2003, *D. Toren 9318*. This was mailed to me on November 1, 2005, but, sadly, I have no record that this specimen ever arrived and there was no duplicate. The second collection was made by David Isle, with Tara Athan, on 12 July 2005, and this specimen was sent separately and arrived safely. This specimen consisted of 2 stem fragments and several mature fruits, from 3 separate plants at the single site, and these have been deposited in the Jepson Herbarium (JEPS) to serve as the holotype. Photographs of the plants were made on August 10 and 27, 2005, by David Isle (Fig. 4) and members of the Sanhedrin Chapter of the California Native Plant Society, whose volunteer members also enclosed 24 of the previously located plants within wire-mesh cages to protect them from animal (deer) foraging—a problem that had already been reported at the site. All of the living stems were quite short and very possibly animal-browsed, but the associated dried stems from the previous season were 30–40 cm tall and probably not browsed (D. Isle, pers. comm.). The chapter volunteers have shown an interest in monitoring these plants and to look for any additional populations. The population appears to be vulnerable to heavy deer foraging, and individuals within the tractor fire line may be damaged by its maintenance.

With the finding of these two new subspecies, there are now six named subspecies of *Sidalcea hickmanii* in California, all of whose populations are small, isolated, and vulnerable. In order to better facilitate their identification, the following key to these subspecies has been provided below.

It should be noted here that flower size in *Sidalcea* often varies by its sexuality—and the genus has often been characterized by the presence of bisexual flowers as well as pistillate flowers in various combinations in the species and on individuals. It is easily observed that pistillate flowers (with aborted anthers) are

Fig. 3. Enlargement of the plant material from the holotype sheet shown in Fig. 2 of *Sidalcea hickmanii* Greene subsp. *pillsburiensis* S.R. Hill (JEPS113056).

Fig. 4. *Sidalcea hickmanii* Greene subsp. *pillsburiensis* S.R. Hill, subsp. nov. Photograph by D.W. Isle, 10 Aug 2005.

generally much smaller than bisexual flowers within a species, having petals even half the length of those in bisexual flowers. The two newly described subspecies of *S. hickmanii* are represented by very few collections, and so the sample size is small. In all of these collections the flowers are bisexual and, therefore, no size variation based on sexuality has been seen. However, I have been unable to find any such size variation in the flowers of any of the subspecies of *S. hickmanii* to date (nor am I aware of any mentioned in the literature for this species). I am not yet willing to generalize that all *S. hickmanii* flowers are bisexual and show no variation in size correlated with their sexuality, but I have, as yet, not observed such variation in the species.

The following key uses the acronyms for bioregional distribution as found in the Jepson Manual (Hickman 1993).

KEY TO CALIFORNIA SUBSPECIES OF *SIDALCEA HICKMANII*

1. Most leaves deeply lobed ± to base.
   2. Bracts ≥ (8–)10–12 mm, ± = calyx; SCoRO: c San Luis Obispo Co. _____ subsp. **anomala**
   2. Bracts 5.5–7 mm, < calyx; NCoRI: Napa Co. _____ subsp. **napensis**, subsp. nov.
1. Leaves not lobed, or deeply crenate to shallowly lobed much less than 1/4 length.
   3. Bracts lanceolate, generally 6–10 mm × 2.5–4 mm wide, ± < calyx; bractlets ± = or < calyx; leaves above unlobed or very shallowly lobed < 1/4 length; SCoRO, w WTR: Santa Barbara Co.; SnBr _____ subsp. **parishii**
   3. Bracts linear, linear-lanceolate, or oblong, 2–7 mm × 0.5–2 mm wide, << calyx; bractlets < calyx; leaves above always unlobed.
      4. Plant generally 4–8 dm, grayish-canescent; calyx densely stellate-puberulent, marginal hairs much longer; bractlets 2–7 mm long; largest leaves deeply cordate, closely crenate, often > 30 mm wide; inflorescence ± dense; SCoRO _____ subsp. **hickmanii**
      4. Plant generally < 4 dm, greenish, less hairy; calyx stellate-puberulent but generally not densely so, hairs uniform in length; bractlets 2–5 mm long; larger leaves truncate to wide-cuneate, coarsely crenate, generally < 25 mm wide, wider in robust plants; inflorescence generally more open.
         5. Bracts of upper flowers generally 2, flat or cupped; leaf blades 1–2.5 cm × 2.5–4 cm wide; stem above with tufted hairs generally 0.5–1.2 mm long; stems generally > 30 cm long, flowers > 10, inflorescence ± spicate in age; calyx 4–7 mm long; n CCo _____ subsp. **viridis**
         5. Bracts of upper flowers 1, cupped; leaf blades 0.6–1.2 cm long × 0.7–2.1 cm wide; stem above with appressed hairs generally 0.2–0.5 mm; stems generally < 30 cm long, flowers < 10, inflorescence not spicate; calyx 4–5.5 mm long, NCoRH: n Lake Co. _____ subsp. **pillsburiensis**, subsp. nov.

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